

U.S. NATIONAL PLAN FOR CIVIL AVIATION HUMAN FACTORS

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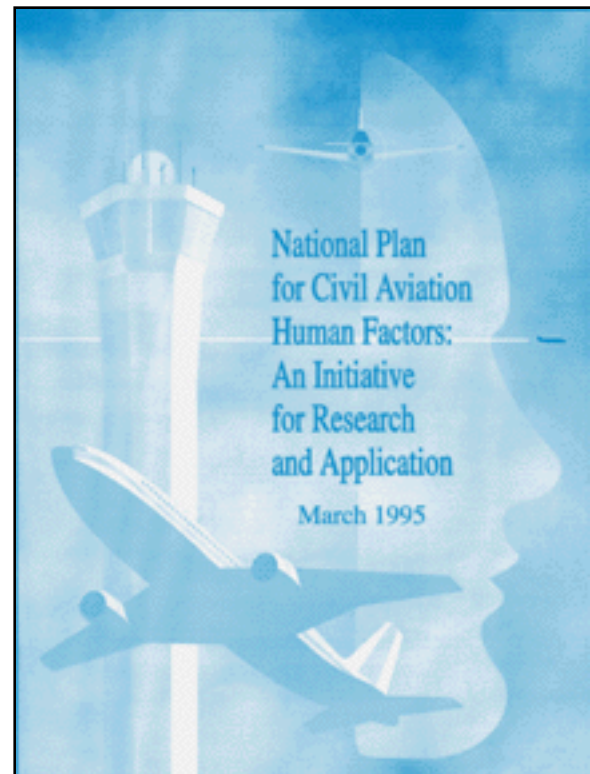
Dr. Mark Hofmann is the Chief Scientific and Technical Advisor for Human Factors at the United States Federal Aviation Administration (FAA). Dr. Hofmann holds degrees from Heidelberg College, the University of South Dakota, and the University of Southern California. He is Board Certified in Professional Ergonomics, and has served as a National Safety Foundation and National Aeronautics and Space Administration Fellow. Dr. Hofmann has held a wide spectrum of human factors and biomedical leadership positions. Before joining the FAA, he served 25 years in the Department of Defense, with four years of active military service from 1967–1971. He is the author, or co-author, of numerous publications, holds memberships in a number of professional organizations, and has received many awards.

I applaud your efforts in holding this conference on human factors and safety. These are topics of great interest to all of us. In this regard, it is a particular pleasure for me to have the opportunity to speak about the *United States National Plan for Civil Aviation Human Factors*. My presentation will cover four major topics related to the *National Plan*:

- the goal and strategy;
- a brief description of the *Plan's* content;
- the benefit of the *Plan*;
- some results.

GOAL AND STRATEGY

The goal of the Plan is to strengthen global air transportation. We believe that a strong air transportation system is vital to our economic health and quality of life. We also believe that human factors can contribute to the strength of air transportation by increasing safety and productivity through the reduction and mitigation of human errors; *and* by reducing system inefficiencies which can be attributed to humans. Success in meeting these human factors challenges helps air transportation meet the cost and safety



expectations of its current customers and helps attract future customers.

For the Plan to be of maximum assistance in reaching our goal, a systems approach was required. That is to say, the Plan had to address

human factors in: commercial as well as non-commercial applications; the design of equipment; procedures, training, and organizational structures; and in functions required by air transportation. Functions required by air transportation include: flight control; air traffic control and management; dispatch; and maintenance of aircraft and airways facilities. Only by addressing the full range of human activities across the system can we achieve our goal.

DESCRIPTION

Fundamentally, the Plan is a strategic statement by the aviation community which identifies priority human factors research needs, and required actions, to ensure the human performance information is applied throughout the aviation system to achieve gains in safety and efficiency. The Plan was published in March of this year after a thorough review by many members of the aviation community, which included the United States Department of Transportation and the Federal Aviation Administration. It bears signatures representing three of our federal agencies concerned with civil aviation — the Department of Defense, the National Aeronautics and Space Administration, and the Federal Aviation Administration. The plan is available on the World Wide Web (<http://www.faa.gov/aar/human-factors/welcome.htm>) and also from the United States National Technological Information Service (Publication Number PB-95-185518).

BENEFIT

The benefits from a National Human Factors Plan are many. However, two benefits require particular emphasis — Focus/Direction and Leverage. Focus/Direction are achieved because the Plan makes human factors research and the needs to apply human factors information clearly visible at the National level. It provides leverage by virtue of bringing the aviation community resources and ideas together to carry out required research and application efforts which have been

commonly accepted. This synergism not only provides efficiencies but assists us in being more proactive in preventing accidents and less reactive in initiating corrective actions after analyzing accidents.

The community which developed the Plan focused on five major core research areas or research thrusts. These areas are:

- **Human-Centered Automation:**
Establishment of human interface design principles and criteria for automated and advanced systems.
- **Selection and Training:**
Establishment of criteria and techniques for efficiently acquiring and training aviation personnel.
- **Human Performance Assessment:**
Establishment and utilization of measures to assess individual, crew, and organizational human performance in aviation systems.
- **Information Management and Display:**
Establishment of critical human performance parameters required to effectively transfer information in the aviation system.
- **Bioaeronautics:**
The bioengineering, biomedicine, and biochemistry associated with performance and safety.

I believe most would agree that these thrusts represent major human factors challenges, especially in view of the rapid changes in computer-based equipment, advanced communication and navigation capabilities, and aviation globalization.

They also identified four necessary elements required to ensure focus and direction for the application of human factors knowledge, and application of the results of this research to the aviation system: Policies; Processes; People and Training; and Tools/Facilities. The Federal Aviation Administration now has a human factors policy which states that human factors must be applied in all agency functions. A process document has been established which requires all

equipment acquisition programs to have a Human Factors Plan, which articulates how human factors is to be systematically and explicitly considered throughout the life cycle of the equipment. In addition, the numbers of human factors specialists are being increased and human factors training materials have been developed and provided to a cross selection of personnel. Also research tools/facilities are being expanded and personnel added. We still have much to do in each element but progress is being made.

Leverage benefits in research and application are also being realized from the Plan. For example, though the National Aeronautics and Space Administration, as well as the Department of Defense have human factors responsibilities well beyond civil aviation. These agencies have significant efforts which apply to, or are specifically directed toward civil aviation. The Plan recognizes these endeavors and provides for common goals and definitions, which results in a higher level of human factors output on behalf of civil aviation than would otherwise be possible. Also, participation by the operational aviation community is recognized in the Plan as being absolutely essential for success. This community includes airlines, pilots, manufacturers, air traffic and maintenance personnel. They provide requirements, subject matter experts, materials, equipment, data, and markets for the products of human performance research.

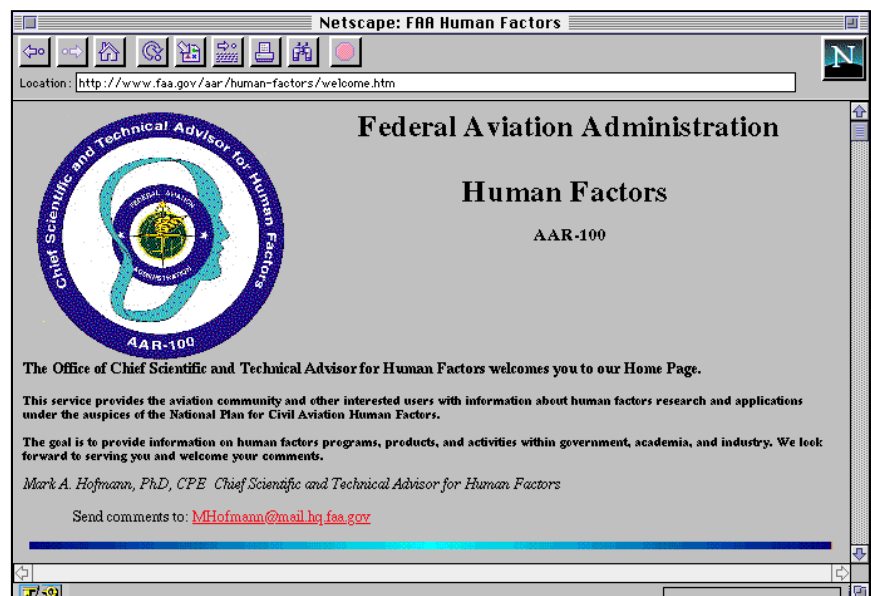
Human factors application leverage follows the same paradigm as research leverage. However, the FAA serves a more central role because of the legal mandates to promulgate and enforce regulatory and certification standards, as well as operate the Nation's air traffic service. However, leverage is gained through the Plan because it serves as the mechanism which brings the community together, which helps drive the applica-

tion of human factors considerations into the above mentioned functions.

RESULTS

The results of the National Plan and efforts prior to its formal publication can be seen in a United States Human Factors Program for Civil Aviation which is engaged in research and applications across all facets of the air transportation system. These efforts are being performed *by* the aviation community, *in* the aviation community, *for* the aviation community. Though much remains to be done and much progress needs to be made — we are up and away in having human factors contribute more to the *efficiency* and *safety* of air transportation.

As a final thought, I mentioned earlier that the *National Plan* can be obtained through our Human Factors Home Page on the Internet. I



encourage everyone in the aviation community to explore our Home Page for information concerning Human Factors research and applications. We are continually updating the materials and expanding coverage to make sure this information is constantly available. Additionally, our Home Page will soon provide an opportunity for you to share your knowledge with others through its input forms capability.